The chapters on human evolution are generally the most reasonable in the book, although there is a persistent Procrustean attempt to make the evolutionary record of hominids fit the model of punctuated equilibrium. I reviewed in 1981 (with three coauthors) the fossil hominid record as a case for punctuated equilibrium, and, after a detailed consideration, we concluded that a hypothesis of gradual change was by far more parsimonious. Eldredge and Tattersall included arguments here, such as evidence that the species *Homo erectus* stayed the same over a long period of time, that they should have known to be incorrect.

The final section of the book was interesting to me because I have a student (Joan Garey) who suggests that Steven Jay Gould and Eldredge derived the idea of punctuational change from Thomas Kuhn's notion of scientific revolutions: long periods of stasis punctuated by very rapid changes. Eldredge and Tattersall even refer to this similarity on page 65. Throughout the book, the reader is built up for some over-arching synthesis of evolutionary change in biological and cultural systems, only to be informed that the "processes . . . are both separate and different" (p. 181). Why then include the last two chapters?

This book would be useful for sparking discussion in a seminar, or for a student to sharpen his or her critical acumen, but a general reader would get a very skewed picture of evolutionary biology and hominid evolution.

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CANADIAN LAWS ON AQUACULTURE

Aquaculture: The Legal Framework, by Bruce H. Wildsmith. Edmond-Montgomery Ltd., Toronto, Ontario, Canada, 1982, 313 p., illus., $45.00 (C82-094673-7).

Traditional aquaculture was conducted by small landholders in inland freshwaters and brackish and saline estuarine and coastal zone waters. Few legal constraints limited the early aquafarmer, and relatively few competitive uses intruded on his riparian rights.

Numerous overwhelming changes have occurred recently that have shaped conditions under which modern aquaculture is being developed and practiced. Increased market demand has stimulated advances in technology, which in turn have justified investment in large-scale, often vertically integrated, cultured aquafoods businesses. Recreational and occupancy activities, among other competitive uses, along marine coasts and lakeshores are impinging on areas suitable for farming. The increase in requirements for ports and navigation, recreational boating and marinas, commercial and sport capture fishing, sand/gravel and petroleum mining, and pollution from storm, domestic, and industrial waste disposal are competing uses intruding on orderly growth and requiring regulatory control.

Wildsmith has ably discussed the resulting legal framework in an effort to review and project policy considerations for legislatures and aquaculturists in Canada. He has identified the common law and statutory components of the institutional/legal climate in which the aquaculture industry is maturing in Canadian waters. Among the numerous impediments to the growth of an industry, he notes, is the paucity of suitable sites satisfying imperative criteria required to reduce risks and to ensure adequate productivity to justify the considerable capital investment demanded. Public policy should be concerned with both environmental protection and ensuring that suitable sites be reserved or zoned for aquaculture. It should also ensure that tenure arrangements are appropriate. Wildsmith proposes that legal and institutional risks be minimized by creating firm personal property rights. He states that public policy formation must be concerned with many business risks such as those relating to site selection, pollution, disease, species selection, provision of seed and feed, and financing. Wildsmith recognizes the need of easing the administrative burden imposed by multiple permits and licenses often required and discusses the aquaculture lease.

A comprehensive review of Canadian legislative provisions, sometimes compared to US federal and state provisions, identifies the current limits and establishes the basis of the structure of a Model Act. The draft of the Model Act encompasses aquaculture development areas, licenses, lease of subaquatic lands, property rights, pollution damage, and appeals board. It also considers financial incentives and the means to harmonize current legislation with a proposed act.

This book accomplishes a commendable review of the current Canadian legal context within which aquaculture can be practiced and provides a critical framework for advancement within the Canadian jurisdiction.

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ARE PESTICIDES NECESSARY?

Are Pesticides Really Necessary? by Keith C. Barrons. Regnery Gateway, Inc., Chicago, IL, 1981, 245 p., illus., $6.95 (paper) (80-54684).

Pesticides have been the subject of much controversy over the past half century. The synthetic organic pesticides such as DDT saved many lives, and the discoverer of DDT was given a Nobel prize. Yet, only a few years later in 1962, Rachel Carson published *Silent Spring*, which predicted many calamitous repercussions from pesticide use and described such approaches to the "control of nature" as the "Neanderthal age of biology and philosophy." In *Are Pesticides Really Necessary* the author proposes to give the reader a balanced insight into the benefits and risks of pest-control chemicals. The credentials of the author to provide such an insight are considerable.

The book is organized into three main sections. The first deals with the factors, natural and manmade, that prevent insects, disease organisms, weeds, and other pests from "overwhelming us." Included are short discussions of the potentials and limitations of breeding for resistance to pests, biological controls, cultural controls, organic farming, and pesticides. This section also includes a chapter on integrated pest management entitled "Putting It All Together." Section II, "The Pesticide Drama," includes 20 short chapters each describing a crop, animal, or human health situation where pests are significant problems, the role that pesticides play in their management, and the impact on food production or on animal and human health and survival. Section III deals with the subject of pesticide safety. Included are chapters on poisons, misconceptions of natural vs. synthetic chemicals, pesticide regulations, pesticide accidents, pesticide controversies, and health questions.

In the three main sections, the author "tried to play the role of a reporter and deal with what I believe to be the facts, or are perceived to be facts by others." I believe that the author was, for the most part, successful in this role. Occasionally, some biases are evident; however, no misrepresentations of factual material were detected. As an epilogue, the author has included a short "editorial" chapter, giving his personal views on a few aspects of the pesticide question. This chapter adds little to the book.

This entire volume is written in a calm, low-key, almost home-spun style. It is laced with the author's personal pest control experiences in gardening and plant breeding for pest resistance. It is singularly free of the strident rhetoric of much of the literature written on both sides of this subject in recent years. It is written for the layman and scientist. This reviewer recommends the book for those seeking a rational presentation of the benefits and limitations of pesticides, including their role in modern agriculture and public health.

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